



Testifying before the House Science Committee in October are Norman R. Augustine (left), retired chairman and CEO of Lockheed Martin; P. Roy Vagelos, retired chairman and CEO of Merck; and William A. Wulf, president of the National Academy of Engineering.

Science Key to Preserving U.S. Standard of Living

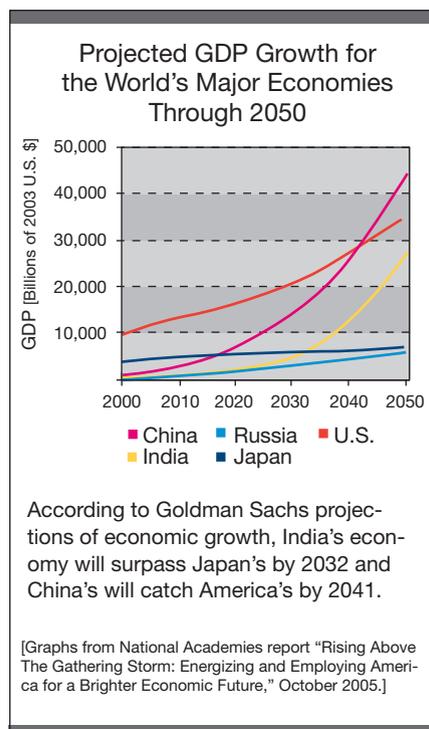
Tom Price

The United States is in danger of losing its world leadership and high standard of living. But the federal government could secure the country's long-term prosperity by reversing disturbing trends in American science.

The troubling warning and hopeful prescription come from a committee that truly deserves the overused title of "distinguished panel of experts." Science leaders in Congress requested the panel, which was organized by the National Academies and chaired by a former head of Lockheed Martin. It includes among its members current or retired chiefs of Intel, Exxon Mobil, Merck, Dupont, MIT and Yale, along with other executives and researchers from industry and education.

The Senate Science and Technology Caucus co-chairs, Republican Lamar Alexander and Democrat Jeff Bingaman, asked the academies how the federal government could help the United States compete successfully in the 21st century's global economy. House Science Committee leaders endorsed the request.

"Without a renewed effort to bolster the foundations of our competitiveness,



we can expect to lose our privileged position," the panel concluded in a report issued in October. "For the first time in generations, the nation's children could face poorer prospects than their parents and grandparents did."

Testifying before the Senate Energy and Natural Resources Committee, panel chair Norman Augustine observed that Americans "tend to believe that scientific and technological leadership, and the high standard of living it underpins, is somehow the natural state of affairs. But such good fortune is not a birthright."

Americans prosper today, the report said, because "we're reaping the fruit of earlier investments." Unless we up the investments we're making now, the panel warned, the future won't be so prosperous. As House Science Committee Chairman Sherwood Boehlert said in responding to the report, "If the United States rests on its withering laurels in this

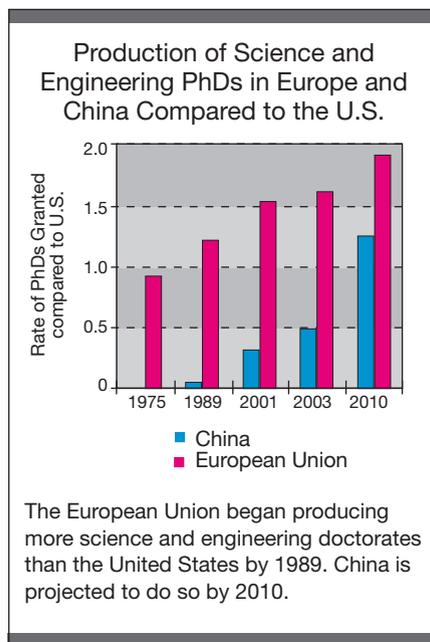
competitive world, we will witness the slow erosion of our preeminence, our security and our standard of living.”

American workers have been able to command premium pay and benefits because of their superior skills. That superiority is now being challenged by overseas workers content to earn a lot less. Companies can hire Chinese chemists for a fifth of what they have to pay Americans, and they can employ Indian engineers for less than 10 percent of what Americans cost, the report said. In the age of the jet airplane and the Internet, it doesn't much matter where a lot of work gets done. So U.S. companies are shipping jobs overseas, and foreign companies have less reason to set up shop here.

Even more troublesome is evidence that young Americans trail their foreign counterparts in science knowledge and interest in science careers. U.S. high school students scored below average in recent international math and science tests, the report said. Last year, Chinese educational institutions graduated more than 600,000 engineers, and Indian schools graduated 350,000. Just 70,000 students earned engineering degrees in the United States, and many of them were foreigners.

Could that have anything to do with the fact that two-thirds of U.S. high school chemistry and physics teachers weren't science majors in college and haven't even earned teacher certification in the subject? Or that most middle-school math teachers don't hold math degrees or certificates?

The United States traditionally has overcome the shortage of homegrown scientists by attracting foreigners to U.S. universities and businesses. But that may become harder to do. An international public opinion survey by the Pew Global Attitudes Project this year found America no longer beckons as the best place to “lead a good life.” Asked where, away from home, that place is, residents in only one of 16 countries ranked the United States first. Australia, Canada, Great Britain and Germany were picked more often.



Since 1990, the United States has turned from being net exporter of high technology into a net importer. Since 1964, U.S. government spending on research and development has dropped from about 2 percent of gross domestic product to less than 1 percent. Because of a growing focus on short-term profits, U.S. companies are abandoning long-term basic research for short-term applied research concentrated on product development.

The panel marshaled many statistics to underscore the importance of science to the U.S. economy. Between 1890 and 1950, for instance, technology was responsible for some 85 percent of U.S. per capita income growth, according to studies published in the 1950s, the report said.

A 1997 study by BankBoston found that graduates of just one research university—the Massachusetts Institute of Technology—had founded 4,000 companies that employed more than a million workers and realized \$232 billion in sales in 1994 alone. More than 730,000 of those jobs were at more than 8,500 U.S. facilities in all 50 states. In the future, the Labor Department projects, demand for workers with science, engineering or technical skills will grow four times faster

than the demand for those with other job qualifications.

The panel recommended a series of federal actions to improve K-12 science and math education, support basic research, educate more U.S.-born scientists, and encourage corporate innovation. The rough “back-of-the-envelope” total cost estimate was \$9 to \$24 billion a year.

Among the proposals for federal funding:

- > Ten thousand new scholarships annually for college students preparing to teach math or science in public schools, with \$10,000 annual bonuses for those who teach in disadvantaged schools.
- > Summer institutes, part-time master's programs and other mid-career education opportunities for math and science teachers.
- > Financial rewards for students who pass advanced placement and international baccalaureate exams.
- > Math and science internships and research opportunities for middle and high school students.
- > A 10-percent annual increase for seven years in federal support for basic research.
- > Research infrastructure grants totaling \$500 million per year for five years.
- > New college scholarships for 25,000 undergraduate and 5,000 graduate students who study science, engineering or math.

The panel termed the cost “modest, relative to the magnitude of the return the nation can expect.” The lawmakers who requested the report responded positively to the recommendations. Alexander and Bingaman promised legislative action next year. ▲

[Tom Price (ThePricesWrite@yahoo.com) is a journalist who focuses on government, politics, technology, business and education.]